federal register

Monday
April 21, 1980

Part IV

Environmental Protection Agency

Review of Standards of Performance For New Stationary Sources; Electric Arc Furnaces

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[FRL 1415-2]

Review of Standards of Performance for New Stationary Sources; Electric Arc Furnaces (Steel Industry)

AGENCY: Environmental Protection Agency.

ACTION: Proposed Rule.

SUMMARY: EPA has reviewed its standards of performance for electric arc furnaces in the steel industry (40 CFR 60.270, Subpart AA) as required under the Clean Air Act, as amended August 1977. EPA intends to explore revising the standards to reflect demonstrated best available control technology for electric arc furnaces and would add argon-oxygen decarbonization (AOD) furnaces to the standard. Visible emission limitations would be reduced to be consistent with improved control technology.

DATES: Comments must be received by June 20, 1980.

ADDRESSES: Send comments to: Central Docket Section (A-130), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460, Attention: Docket A-79-33. Comments should be submitted in duplicate if possible.

FOR FURTHER INFORMATION CONTACT: Mr. Stanley T. Cuffe, Telephone: (919) 541-5295. The document "A Review of Standards of Performance for Electric Arc Furnaces in the Steel Industry" is available upon request from Mr. Stanley T. Cuffe, (MD-13), Chief, Industrial Studies Branch, Emission Standards and Engineering Division, U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711.

SUPPLEMENTARY INFORMATION:

Background

On October 21, 1974, EPA proposed a standard under Section 111 of the Clean Air Act to control particulate matter emissions from electric arc furnaces (EAF) in the steel industry. The standard, promulgated on September 23, 1975, applies to any facility constructed or modified after October 21, 1974. The standard for particulate matter under § 60.272 limits the discharge to atmosphere from an electric arc furnace of any gases that:

1. Contain particulate matter in excess of 12 mg/dscm (0.0052 gr/dscf).

2. Exhibit 3 percent opacity or greater from a control device.

3. Exhibit greater than zero opacity from a shop, due solely to operation of any EAF(s), except:

a. Shop opacity greater than zero percent, but less than 20 percent, may occur during charging periods.

b. Shop opacity greater than zero percent, but less than 40 percent, may occur during tapping periods.

c. Zero opacity from a shop shall apply only during periods when process flow rates and pressures are being monitored.

d. Where the capture system is operated such that the roof of the shop is closed during the charge and the tap, and emissions to the atmosphere are prevented until the roof is opened after completion of the charge or tap, the shop opacity standards shall apply when the roof is opened and shall continue to apply for the length of time defined by the charging and/or tapping periods.

The standard for particulate matter also limits the discharge to atmosphere from dust handling equipment any gases which exhibit 10 percent opacity or greater.

The Clean Air Act Amendments of 1977 that require the Administrator of EPA review, establish standards of performance for new stationary sources (NSPS) at least every 4 years, and revise them as appropriate [Section 111(b)(1)(B)]. EPA has completed such a review of the standard of performance for electric arc furnaces in the steel industry and has decided to begin a project to revise the standard. EPA invites comments on this decision and on the findings on which it is based.

Findings

Industry Statistics

In 1972, there were approximately 299 EAF's in the United States. In 1977, there were approximately 303 EAF's being operated in the United States. However, about 30 EAF's were being installed between 1974 and 1979, which indicates that some older furnaces were probably shutdown and replaced. Only five of the new furnaces were subject to the standards.

Information on planned new facilities or modifications is limited by the reluctance of industry to state future plans because of current economic uncertainties. Nevertheless, EAF production should continue to increase. An EAF is flexible, can operate wholly on steel scrap, is adapted to ultrarapid melting, can make specialty steels, and can be quickly brought on line or taken off production. In addition, an EAF is relatively low in pollution potential, and emission controls are well demonstrated. These EAF advantages are substantiated by industry statistics showing that production in 1977 was about 25.4 Mg (27.9 million tons) and 29 Mg (31.9 million tons) in 1978 versus 21.5 Mg (23.7 million tons) in 1972, when the NSPS document was being developed.

Emissions and Control Technology

The current best demonstrated control technology, the fabric filter, is the same as that used when the standards were promulgated. No major improvements in this technology have occurred during the intervening period; however, one company has installed a proprietary wet scrubber, which appears to be almost as effective as a fabric filter and meets the standards.

Although the fabric filter technology has not changed, the effectiveness of pickup systems for various process and fugitive emissions has improved significantly.

Some EAF shops are now operating with closed roofs and a controlled fugitive emission pickup system in the roof to draw any indoor emissions into the control device. This system may utilize small openings in the ductwork to draw emissions slowly out of the roof area, or it may include dampers in the openings that can be opened or closed to remove these rooftop emissions. The roof emissions include charging and tapping emissions, and those that escape the direct furnace evacuation system and the canopy hoods above the furnace. The closed-roof and fugitive emission pickup system was designed to meet some local agencies no-visible-emission requirements from an EAF shop.

Other recent technology includes total enclosure of the furnace within the EAF building. The system is designed to capture all emissions of the furnace operation cycle (meltdown, charging, tapping, and slagging). Hoods are strategically located for capture of the charging, tapping, and slagging emissions. Additionally, during the charging operation, a curtain of air is blown across the roof opening to direct the emissions into the intake duct of the control device. This system theoretically prevents almost all emissions from escaping the enclosure and building.

Another new concept for containing emissions from the EAF is a partial enclosure around the furnace. The furnace itself may be equipped with the conventional direct shell evacuation and canopy hood system, but the partial enclosure around the furnace acts as a stack to direct fugitive furnace emissions upward into the emission capture system. Separate hoods are used to capture emissions during the tapping and slagging operation. The EAF

shop roof is closed and the area above the furnace and below the canopy hood must be kept clear so that the furnace can be charged normally by a crane. The partial enclosure is large enough to allow the furnace cover to be swung over the tapping area, where it can capture emissions from the ladle pouring spout and tapping hoods. This total system is reported to be virtually 100 percent effective in capturing all emissions from the furnace shop during normal operations.

Although about 30 furnaces were reported to have started operation from 1974 to 1979, only 5 commenced construction after the proposal of NSPS and therefore were subject to regulation. Only one of these five furnaces has been tested for visible emissions because the others have not completed their startup. Although the latter met the NSPS for visible emissions, the furnace shop did create an enforcement issue. The furnace shop has a closed roof; however, some visible emissions from charging or tapping operations drifted out the material access doors of the shop when they were open. Also, these charging and tapping emissions became intermingled and were emitted simultaneously due to other furnaces operating in the shop. The enforcement issue arose when it became unclear how to enforce NSPS when charging, tapping, and other shop emissions became mixed and escaped from the doors instead of the roof. These problems are expected to be recurring, as other new furnaces start operation and the NSPS may require further study to clarify the visible emission standard to cover this situation.

Four other recently constructed EAF's were required by local agencies to at least meet NSPS even though their construction started before NSPS proposal. One shop with two partially-enclosed furnaces using canopy hoods and sealed roof was tested for particulate and visible emissions. The local agency concluded that the system would meet NSPS based on their source tests. However, the control system uses a pressure baghouse, and the testing was conducted by company personnel in the presence of local agency observers. In tests of various compartments of the baghouse with a Hi-Vol sampler, the results show that the emissions ranged from 0.0097 mg/dscm (0.0000042 gr/dscf) to 0.08 mg/dscm (0.0000346 gr/dscf) during twelve 4- to 5-hour tests. However, this is not an official EPA testing method and further investigation by EPA will be necessary to substantiate this data.

The current standard does not cover several types of electric furnaces. The unregulated electric furnaces are: vaccum-arc remelting (VAR), vacuum induction melting (VIM), electro-slag remelting (ESR), and consumable electrode melting (CEM) which are primarily used to produce small tonnages of specialty steels. Investigation by EPA during this review revealed that the VAR, VIM, CEM, and ESR furnaces do not produce any significant emissions; therefore, they should not be considered for NSPS. Furthermore, these low polluting specialty furnaces are not capable of being replacements for the much larger conventional electric arc furnace which has a higher pollution potential.

Argon-oxygen decarbonization furnaces were found to be a highly significant emitter of particulate and visible emissions, and these furnaces are becoming an integral part of EAF shops that produce stainless steels. AOD furnaces are economical and flexible to operate; therefore, their use is expected to increase. Because AOD furnaces operate within an EAF shop, produce significant amounts of particulate and visible emissions, and use similar air pollution control devices, AOD furnaces should be included in the NSPS study for the EAF. One AOD furnace with canopy hood and baghouse was tested for particulate emissions. The average test result of 6.9 mg/dscm (0.0030 gr/dscf) for the AOD furnace is lower than the current EAF standard of 12 mg/dscm (0.0052 gr/dscf). Hence, the NSPS review for EAF should include AOD furnaces.

Conclusions

Based upon the review of the current NSPS previously summarized, a program to revise the standard is needed. This program, which is expected to begin in fiscal year 1980, will be directed toward:

1. Reviewing new particulate emission data based on the capabilities of the best available technology today. The investigation will include analysis of costs associated with this technology.

2. Reviewing new opacity data from recently designed efficient exhaust techniques, closed roofs for fugitive emissions, and improved hood collection for charging, tapping, and slagging emissions. These systems, where installed, appear to significantly reduced visible emissions from EAF shops.

3. Consideration of including the AOD furnace emissions in the revised EAF standard, or development of a separate standard for these furnaces. They are a highly visible source of particulate emissions.

All interested parties are invited to comment on this review, the conclusions, and EPA's planned course of action.

Dated April 11, 1980.

Douglas M. Costle,

Administrator.

[FR Doc. 80-11284 Filed 4-18-80; 8:45 am]

BILLING CODE 6560-01-M